



Predictive analytics: On track for a brighter tomorrow

Educators and administrators collect valuable information electronically but need an effective way to analyze it to enhance instruction and operational efficiency. Learn how predictive analytics enables two institutions to help students stay on track.

Enterprising K–12 school districts and institutions of higher learning across the United States are turning toward predictive analytics to help students flourish, particularly at-risk learners who may be struggling. Although educational institutions have developed outstanding ideas about how to tackle challenges such as performance, attendance, and graduation rates, few had the technology to harness, consolidate, and analyze available data—let alone a convenient, effective way to draw actionable insight from the data. That situation is changing with the availability of decision support systems based on predictive models to help drive successful teaching and learning outcomes.

Robust data management and predictive insight solutions from Dell and Intel are delivering results today, as seen by Dr. Jamie Wilson, superintendent of Denton Independent School District in Texas, and Dr. Vince Kellen, senior vice provost for Academic Planning, Analytics, and Technologies for the University of Kentucky. (For more information, see the sidebar, “Empowering successful student outcomes.”) Join these leaders in discussion to discover how they are helping boost the effectiveness of what happens in the classroom. At the same time, they are working to deliver on the vision of a system that follows students from kindergarten through higher education and ensures nobody falls through the cracks.



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—Dr. Jamie Wilson
Superintendent, Denton Independent School District
February 2013

What driving forces led to a predictive analytics solution?

Dr. Jamie Wilson: Our main challenge was one that relates to many K–12 school districts: a lot of data, and an inability to turn it into something useful. In other words, we collected great information about student performance and attendance, but we lacked a way to consolidate it and get it to the right people at the right time. If we can spot trends quickly—or even predict them—then we can act on them quickly.

In addition to performance and attendance, a lot of variables help us understand how to help students succeed. Economics, family history, language spoken at home—all of these factors tell us important information. But we didn't have a way to consolidate, analyze, and act on that information.

Dr. Vince Kellen: At the university level, we have some of the same concerns. But when students fall off track in college, they're more likely to just drop out. Retention at this level is a complex issue, because it also involves things like family readiness, financial means, and student confusion about what fields they want to study and what careers they want to pursue. It's really important for us to understand these factors and how they help predict successful outcomes, because acquisition of students is far more costly than retention.

How can clear insight into students lead to successful outcomes?

Wilson: Our goal is get our graduation rate up to 100 percent. To make that happen, we need the ability to spot early warning signs and place students in the right classroom situations. We don't want to wait for our students to fail. If our teachers know right away who's on track, who's off track, and how they need to adjust their approach, then they can make a difference. We've always had the data. It's just that nobody could ever get to it fast enough to make the biggest possible difference.

For example, in the past, if a teacher wanted to know how a student from a non-English-speaking home was performing on certain benchmarks, the teacher would request a report from our district's data and assessment coordinator. Compiling that data manually usually took between four and six days; meanwhile, the teacher would be waiting for that data to inform his or her instruction. By getting that data immediately, the teacher can quickly determine what's working and what's not working—while there's still time to take action.

Kellen: The situation is similar for us. We know that if we have some of those same abilities to spot early warning signs in performance, we'll be able to make the right changes to keep students on track. At the university level, though, we don't just want

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Empowering successful student outcomes

Dell™ Education Data Management (EDM), developed in collaboration with Intel, is a predictive decision support system that enables educational institutions to develop actionable insights from data. With Dell EDM, institutions can track student information over multiple years and across multiple schools.

Denton Independent School District implemented a Dell EDM system that is based on Microsoft® SharePoint® collaboration and Microsoft SQL Server® database software. This data warehousing and predictive analytics system aggregates millions of performance data points on more than 25,000 students from disparate software systems to help the district improve student learning and increase retention. Teachers and administrators at each campus can view different dashboards that are customized with the information they need to see.

The University of Kentucky turned to Dell Services for help in deploying a Dell EDM system driven by SAP® HANA™ database software. SAP HANA provides a foundation for the university's student retention analytics model, which runs on Dell PowerEdge™ R910 servers powered by the Intel® Xeon® processor E7 family.

The high-speed, in-memory, real-time performance of SAP HANA enables the University of Kentucky to quickly analyze and predict the likelihood of student graduation. Proactive, timely feedback on student performance allows faculty and staff to intervene early with at-risk students and to help improve overall student engagement.

to gather data on students. We want to involve them in the process. For example, we want to provide students with feedback on their academic progress and give them some personalized tips and reminders to help them succeed. Also, if we can provide faculty, staff, and administrators with student feedback, then those people are in a position to make better decisions—adjust their styles, modify course content, design new programs, things like that. We feel these kinds of insights are key to helping students graduate at a faster rate than they had been.

What about the budgetary impact?

Wilson: School funding from the state of Texas is based on student attendance. Not only are students with poor attendance at risk themselves, but they also bring down the level of resources that we have to help other students be successful. The budget for our school system is right at US\$200 million, and it's based upon a weighted average daily attendance. So even if we increase our attendance by 1 percent—a very conservative goal—that represents US\$2 million in additional funding.

Kellen: The budgetary impact, that's a good question. We did have to spend some money to get the project started. But we constructed our business model such that the project pays for itself. Down the road, we also hope that our education data management (EDM) solution contributes to improvements in student retention. That can translate into positive budget impact as more students choose to continue their education. Every 1 percent increase in retention can generate over US\$1 million in yearly revenue.

How has the picture changed since implementation?

Wilson: Our EDM system tracks each student's data between schools and over multiple years. We can monitor student progress and respond to whatever

developmental needs students may have, without delay. Now, not only can our teachers access data faster, they also can access data that is much richer than ever before. They don't have to rely on standardized test scores that come out just once a year. They can actually incorporate their own assessments. So we can do assessments every three weeks if we need to. That tells us in a much clearer way what's working and what's not so we can course-correct immediately.

We even have dashboards for each school campus and color-coded alerts next to each student's name. A yellow alert represents the predictive analytics working, and it tells us something's not right and that we need to dig deeper to fix it. Our teachers work as hard and as long as it takes to get the job done. And now, we're enabling them to work much smarter.

Kellen: We went live pretty recently, but we already have a lot of excitement around the project. We initially brought in a panel of students to give us feedback on early prototypes and concepts, so we feel that we've created something that's going to work well for everybody.

We're working on a mobile application that will give students information about themselves, their academic progress, and tips—sort of like a mobile academic health record. Students can also give us feedback to help ensure we're meeting their needs.

The second component is an advisor tool set, which gives advisors access to student information so they can better determine how to help individual students. It also provides them with automatic alerts when the analytics determine that individual students need help. What's already in place is a system that slices and dices student data to determine what we call a *K score*. The *K score* tells us how engaged a student is with us, and we're continuing to hone the system to make it more powerful and sophisticated.

We're also looking to the future with Dell, SAP, and some other partners to apply advanced analytics to the e-learning environment. If software can adjust to individual learners dynamically and personalize teaching, then we can help our distance-learning students be even more successful.

How can collaboration through predictive analytics spur student success across K–20?

Wilson: It's difficult to have longitudinal systems when the systems don't communicate with each other. So that linkage must come first. But the possibilities are huge. We're collecting this data beginning when students are in third grade. And if we can track performance in higher education, then trace it back to performance in K–12, we can be more successful in identifying students who are at risk early. In other words, if we can understand why some students don't succeed at the university level, we can look back at their K–12 experience and see what happened there. We're beginning to build relationships with local universities to create models to make this idea a reality.

Kellen: In Kentucky, we have a longitudinal database that collects data for K–20, and that data is starting to be shared across the educational community in the state. It is critical to the future, because some problems seen in higher education may have manifested earlier downstream in K–12. By working together, we may be able to address these problems earlier, and then they won't exist by the time kids get to university. ^{PS}

Learn more

Dell Education Data Management:
dell.com/edm

Dell SAP HANA solution:
qrs.ly/12322b7